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RFTB202 Turbine Flowmeter

- ▶ High pressure
- ▶ Low pressure loss
- ▶ High repeatability and accuracy
- ▶ Pulse / analog output selectable
- ▶ Fast response time



Fluid flowing through RFTB202 push the rotor to revolve. As the rotor blade pass the pickoffs, generate electrical pulses which frequency is proportional to the flow rate. The revolutions per minute and the K-factor (number of pulses/Gallon) make it possible to obtain the flow volume passing through the unit.

RFTB202 series are used to measure medium or lower viscosity media, such as water, light fuel, solvent, hydraulic oil, lubricating oil etc.

Specifications

Nominal Diameter	DN4 to DN40
Applicable Medium	Medium or lower viscosity liquids
Accuracy	Better than $\pm 1\%$ of reading, $\pm 0.5\%$ and $\pm 0.2\%$ selectable
Repeatability	$\pm 0.1\%$ of reading
Pressure Rating	MAX. 420bar
Ambient Temperature	-40 to 85°C
Medium Temperature	-40 to 120°C, -200 to 400°C (High temperature type)
Materials	
Body / Rotor Support	304 stainless steel (316 stainless steel optional)
Turbine	Stainless steel
Shaft	Tungsten carbide/ceramic
Bearing	Stainless steel ball bearing, Tungsten carbide/ceramic journal bearing
Process Connection	BSPF female thread, NPT female thread

Applications

- ▶ Petrochemical/energy industry
- ▶ Hydraulics/lubrication system
- ▶ Oil and Gas
- ▶ Test systems
- ▶ Water treatment

Parameter Table

Type	Flow Range(L/Min.)		Max. Pressure (bar)	DN (mm)	Process Connection BSPP/NPT	Filtration(micron)	
	Magnetic Pickoff	Encode Pickoff				Journal Bearing	Ball Bearing
RFTB202-GF/NF-4.5L	0.6 to 4.5	0.6 to 4.5	420	4	G1/4" or 1/4"NPT	75	--
RFTB202-GF/NF-10L	1.6 to 10	0.8 to 10	420	6	G1/4" or 1/4"NPT	75	--
RFTB202-GF/NF-20L	3 to 20	1.5 to 20	420	10	G3/8" or 3/8"NPT	100	30
RFTB202-GF/NF-100L	10 to 100	5 to 100	420	15	G1/2" or 1/2"NPT	150	50
RFTB202-GF/NF-130L	13 to 130	6 to 130	420	20	G3/4" or 3/4"NPT	150	50
RFTB202-GF/NF-170L	17 to 170	8 to 170	420	25	G1" or 1"NPT	150	70
RFTB202-GF/NF-250L	25 to 250	12 to 250	420	32	G1-1/4" or 1-1/4"NPT	200	100
RFTB202-GF/NF-320L	32 to 320	16 to 320	420	40	G1-1/2" or 1-1/2"NPT	200	100

Pickoffs & Amplifiers

RFTB202 can be integrated with several different pickoffs, preamplifiers and signal conditioners, such as magnetic pickoffs, encode pickoffs, linear correction preamplifiers, smart control units, to meet specific measurement needs.

Pickoffs

Magnetic pickoffs can sense a ferrous rotor and is ideal for use in all types of Reliant turbine flowmeters. Options include cryogenic, high temperature and explosion proof.

Encode pickoffs offer low speed response, no drag, large sensing distance and can sense non-ferrous metals like aluminum or nonmagnetic stainless steel in addition to ferrous metal. Unlike magnetic pickoff, a carrier frequency pickoff is not a passive device and requires coupling with a signal conditioners/preamplifier. These devices produce a square wave output versus the analog sine wave of the magnetic pickoff.

Amplifiers

Reliant has developed a line of preamplifiers and signal conditioners for installation with our pickoffs. Our offerings include preamplifiers in several different configurations.

- Pulse output amplifier - Output with square signal, proportional to the flow rate.
- Amplifier with linearized pulse output - Extending the measuring range and with multi-point linearization, with square wave output, frequency proportional to the flow rate.
- Amplifier with analog output - Current analog output or voltage analog output, such as 0 to 10V, 0 to 5V, 0 to 20mA, 4- 20mA.
- Amplifier with linearized analog output - Extended measuring range and with multi-point linearization, analog output.
- Intelligent flow computer - Digital display, analog output / communication RS485/ switch output optional.

Bearings

Bearings are available in three types, stainless steel ball, tungsten carbide journal sleeve and ceramic journal sleeve. Ceramic bearing eliminates adhesive wear and perform well in low or non-lubricating liquids found in cryogenic fluids and water. Ball bearings have the least amount of drag, thus provide the widest capable flow range. Journal bearings create more drag, therefore reducing the turndown capability of the flowmeter.

- **Tungsten carbide journal bearing** - Applicable to low or non-lubricating media, narrow turndown ratio of the flow meter relative with ball bearing.
- **Stainless steel ball bearing** - Applicable to lubricating media, with low friction, lower limit for flow meter and wider turndown ratio.
- **Ceramic journal bearing** - Self-lubricating, applicable to non-lubricating media such as liquid nitrogen, narrow turndown ratio of the flow meter relative with ball bearing.

Electronics

VS - Magnetic pickoffs with pulse output amplifier

RS - Encode pickoffs with pulse output amplifier

Power Supply	12 to 30VDC
Current Consumption	8mA
Outputs	NPN OC output, NPN OC output+pull-up resistor
Reverse Polarity Proof	Yes
Short-circuit Proof	Yes
Operating Temperature	-40 to 120°C
Ambient Temperature	-40 to 85°C
Electrical Connection	M12x1plug
	DIN43650-A plug (solenoid plug)
Protection Class	M12X1plug: IP67
	DIN43650-A plug: IP65



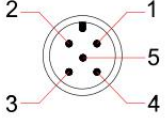
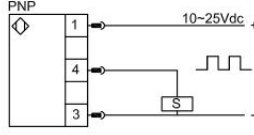
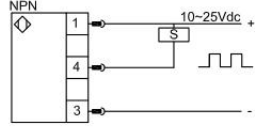
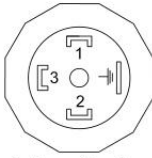
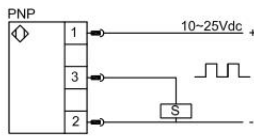
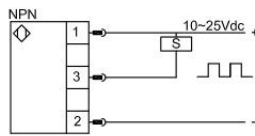
VH - High temperature magnetic pickoffs with pulse output amplifier

RH - High temperature Encode pickoffs with pulse output amplifier

Ambient Temperature	-40 to 85°C
Operating Temperature	VH -200 to 400°C
	RH -40 to 200°C

◆ Other parameters please refer to the above

Wiring - Pulse Output

Wiring	PNP output	NPN output												
 <table border="1"> <thead> <tr> <th>Signal</th> <th>Plug</th> <th>Cable</th> </tr> </thead> <tbody> <tr> <td>U+</td> <td>1</td> <td>Brown</td> </tr> <tr> <td>Pulse</td> <td>4</td> <td>Black</td> </tr> <tr> <td>U-</td> <td>3</td> <td>Blue</td> </tr> </tbody> </table> <p>M12x1 plug</p>	Signal	Plug	Cable	U+	1	Brown	Pulse	4	Black	U-	3	Blue		
Signal	Plug	Cable												
U+	1	Brown												
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Signal	Plug													
U+	1													
Pulse	3													
U-	2													

VA - Magnetic pickoffs with analog output amplifier
 RA - Encode pickoffs with analog output amplifier

Power Supply	12 to 30VDC
Current Consumption	Voltage analog output: 7mA Current analog output: <12mA
Outputs	0 to 10V 3-wire 0 to 20mA or 4 to 20mA
Reverse Polarity Proof	Yes
Short-circuit Proof	Yes
Operating Temperature	-40 to 120°C
Ambient Temperature	-40 to 85°C
Electrical Connection	M12x1 plug DIN43650-A plug (solenoid plug)
Protection Class	M12X1plug: IP67 DIN43650-A plug: IP65



VAH - High temperature magnetic pickoffs with analog output amplifier
 RAH - High temperature encode pickoffs with analog output amplifier

Ambient Temperature	-40 to 85°C
Operating Temperature	VAH -200 to 400°C RAH -40 to 200°C

◆ Other parameters please refer to the above

Wiring - Analog Output: 3-wiring 4...20mA

Wiring		4...20mA (3-wire)												
<p>M12x1 plug</p>	<table border="1"> <thead> <tr> <th>Signal</th> <th>Plug</th> <th>Cable</th> </tr> </thead> <tbody> <tr> <td>U+</td> <td>1</td> <td>Brown</td> </tr> <tr> <td>output</td> <td>2</td> <td>White</td> </tr> <tr> <td>U-</td> <td>3</td> <td>Blue</td> </tr> </tbody> </table>	Signal	Plug	Cable	U+	1	Brown	output	2	White	U-	3	Blue	
Signal	Plug	Cable												
U+	1	Brown												
output	2	White												
U-	3	Blue												
<p>Solenoid plug</p>	<table border="1"> <thead> <tr> <th>Signal</th> <th>Plug</th> </tr> </thead> <tbody> <tr> <td>U+</td> <td>1</td> </tr> <tr> <td>output</td> <td>3</td> </tr> <tr> <td>U-</td> <td>2</td> </tr> </tbody> </table>	Signal	Plug	U+	1	output	3	U-	2					
Signal	Plug													
U+	1													
output	3													
U-	2													

DWEVS - Smart control unit with magnetic pickoffs

DWERS - Smart control unit with carrier frequency pickoffs

Power Supply (Us)	12 to 30VDC
Current Consumption	<20mA
Switching Output	
Output	Push-pull (compatible with PNP / NPN)
Current	500mA (power supply 24VDC)
Current Analog Output	
Output	3 2-wire 4 to 20mA programable
Load RA (Ω)	RA ≤ (Us-10) / 0.02
Linearity	≤±0.5% of reading
Voltage Analog Output	
Output	3-wire 0 to 5V/1 to 5V programable
Load RA (Ω)	RA ≥ 5KΩ
Linearity	≤±0.5% of reading
Accuracy	≤±0.5% of reading
Temperature	
Operating Temperature	-40 to 120°C
Ambient/Storage	-40 to 85°C
Display	8mm height, red 4-digit LED
Material	
Display Head	304 stainless steel (316L customized) + PP
Housing	304 stainless steel (316L customized)
Protection Class	IP67
Electrical Connection	M12×1plug



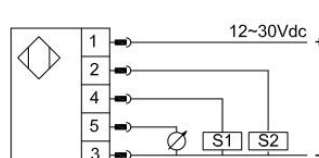
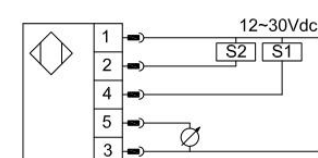
DWEVH - Smart control unit with high temperature magnetic pickoffs

DWERH - Smart control unit with high temperature encode pickoffs

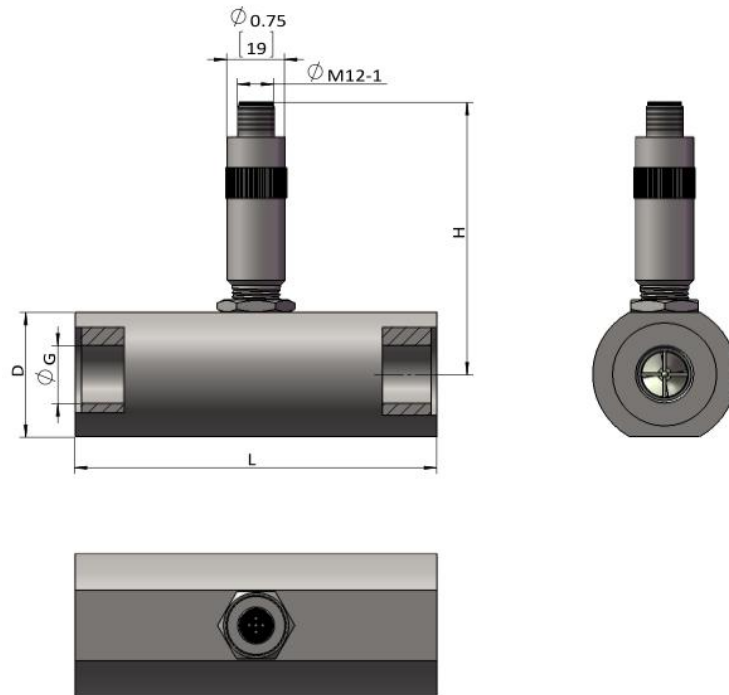
Ambient Temperature	-40 to 85°C
Operating Temperature	-40 to 200°C

◆ Other parameters please refer to the above

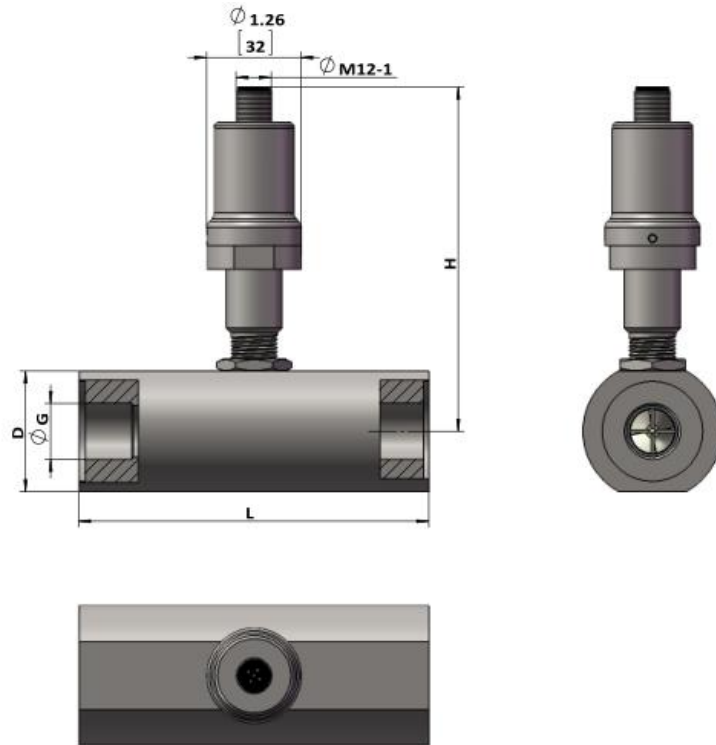
Wiring

PNP output	NPN output
<p>2xPNP + analog output</p> 	<p>2xNPN + analog output</p> 

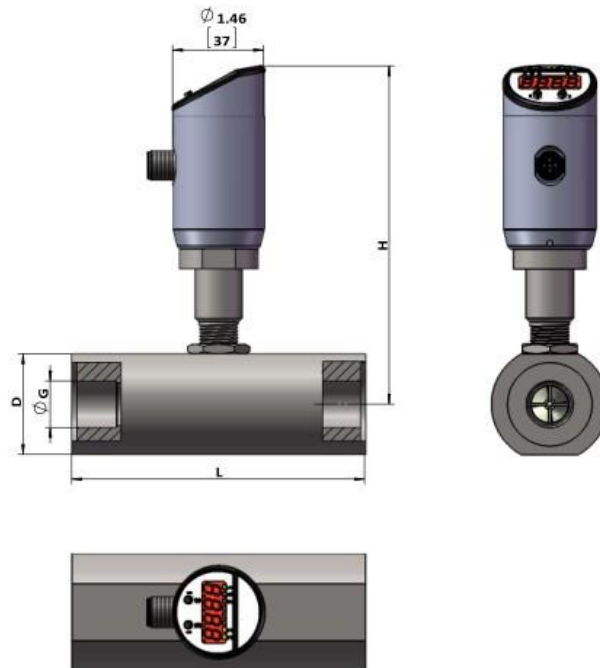
Dimensions



Pulse output



Analog output



Smart control unit

Dimensions in inches (mm)

BSPP/NPT (Nominal Dia.)	L inch (mm)	D inch (mm)	H for pulse output inch (mm)	H for analog output inch (mm)	H for smart control unit inch (mm)
1/4" (DN4)	2.44 (62)	1.3 (33)	3.35(85)	5.16 (131)	5.31 (135)
1/4" (DN6)	2.44 (62)	1.3 (33)	3.39 (86)	5.2 (132)	5.35 (136)
3/8" (DN10)	2.48 (63)	1.42 (36)	3.46 (88)	5.28 (134)	5.43 (138)
1/2" (DN15)	4.3 (109)	1.85 (47)	3.54(90)	5.35 (136)	5.51 (140)
3/4" (DN20)	5.0 (127)	2.05 (52)	3.66 (93)	5.47 (139)	5.63 (143)
1 (DN25)	6.46 (164)	2.2 (56)	3.74 (95)	5.55 (141)	5.71 (145)
1-1/4" (DN32)	6.85 (174)	2.6 (66)	3.9 (99)	5.71(145)	5.87 (149)
1-1/2" (DN40)	7.76 (197)	3.0 (76)	4.06 (103)	5.87 (149)	6.02 (153)

Order Code

RFTB202 :		Turbine flow meter	
Thread type			
GF:	BSPP female thread (G thread)		
NF:	NPT female thread		
Nominal diameter			
04 :	DN4 thread size G1/4 or 1/4"NPT		
06 :	DN6 thread size G1/4 or 1/4"NPT		
10 :	DN10 thread size G3/8 or 3/8"NPT		
15 :	DN15 thread size G1/2 or 1/2"NPT		
20 :	DN20 thread size G3/4 or 3/4"NPT		
25 :	DN25 thread size G1 or 1"NPT		
32 :	DN32 thread size G1-1/4 or 1-1/4"NPT		
40 :	DN40 thread size G1-1/2 or 1-1/2"NPT		
Bearing			
BB :	Stainless steel ball bearing (unavailable for DN4 and DN6)		
TC :	Tungsten carbide journal bearing		
CC :	Ceramic journal bearing		

RFTB202	GF	15	BB	B	170L	1	VS	-	H
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Accuracy

A : 0.2% of reading **C :** 1% of reading
B : 0.5% of reading **S :** Customized

Measuring range (see technical data for details)

4.5L : Upper flow limit 4.5L/min **130L :** Upper flow limit 130L/min **10L :** Upper flow limit 10L/min
170L : Upper flow limit 170L/min **20L :** Upper flow limit 20L/min **250L :** Upper flow limit 250L/min
100L : Upper flow limit 100L/min **320L :** Upper flow limit 320L/min **Turndown ratio** (Upper flow limit : lower flow limit)

1 : 10:1 **3 :** 30:1 **5 :** 50:1
2 : 20:1 **4 :** 40:1

Note: Meter with wide turndown ratio (40:1 or 50:1) should be used with encode pickoffs and stainless steel ball bearing.

Pickoffs type (see technical data for details)

VS : magnetic pickoffs wit pulse output amplifier
VH : High temperature magnetic pickoffs with pulse output amplifier
VA : magnetic pickoffs with analog output amplifier
VAH : High temperature magnetic pickoffs with analog output amplifier
RS : Encode pickoffs with pulse output amplifier
RH : High temperature encode pickoffs with pulse output amplifier
RA : Encode pickoffs with analog output amplifier
RAH : High temperature encode pickoffs with analog output amplifier
DWEVS : Smart control unit with magnetic pickoffs
DWEVH : Smart control unit with high temperature magnetic pickoffs
DWERS : Smart control unit with encode pickoffs
DWERH : Smart control unit with high temperature encode pickoffs



Outputs

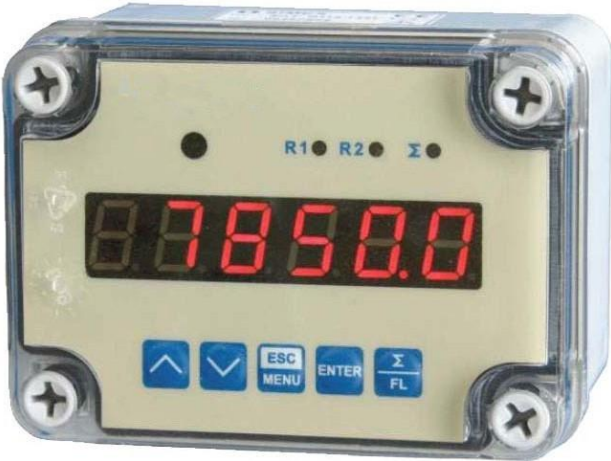

- : Pulse **A420 :** 4 to 20mA **V005 :** 0 to 5V
A020 : 0 to 20mA **V010 :** 0 to 10V **V105 :** 1 to 5V

Electrical connection

H : DIN43650-A plug (unavailable for DWE series)
S : M12X1 plug

Electronic Evaluation Units

MST300 - Ratemeter, totalizer	MST200 - Ratemeter, batcher, totalizer
	
Case dimensions 72 x 36 x 97 mm	Case dimensions 96 x 48 x 100 mm
6-digit LED display	6-digit LED display
Flow meter/totalizer	Flow meter/totalizer/batcher
Flow rate/total flow display	Flow rate/total flow display
1 pulse input	1 pulse counting input + 3 control inputs
1 relay (or OC) output	0/2 or 4 Relay / OC outputs
Power supply output 24V DC	Analog output optional
RS-485 / Modbus RTU	Power supply output 24V DC
	RS-485 / Modbus RTU

MST300 - Ratemeter, totalizer	MST200 - Ratemeter, batcher, totalizer
	
Protection class IP67	Max. 72 inputs with the flow/temperature/pressure/level

Case dimensions 110 x 80 x 67mm	Optional outputs with 24 analog outputs/72 SSR outputs
6-digit LED display	Data recording and display
Flow meter/totalizer/batcher	Case dimensions 144X144X100
Flow rate/total flow display	Communication interfaces: RS-485/Modbus RTU, USB, Earthnet 10MB , enhanced ACM version
1 pulse counting input + 3 control inputs	
0/2 or 4 REL / OC outputs	5.7", TFT color graphic display with Touch-panel, 320X240 pixels
Analog output optional	Recording speed: from 0.1s up to 24h, resolution 0.1s
Power supply output 24V DC	Memory capacity: 1.5 GB
RS-485 / Modbus RTU	Free configuration software

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